the mantle of science. Until any significant discoveries are made, science can justifiably ignore it, but it is important to say why: Parascience is a pseudoscientific system of untestable beliefs steeped in illusion, error and fraud."

What Marks emphasizes and Oppenheim ignores are differences between science and parascience that are far more profound than Oppenheim's trite and superficial conception of a "common goal." We seem to live in an age in which declarations of noble intentions can be used to exculpate anything from mindless credulity to bloody terrorism. What such declarations do, of course, is to encourage credulity and terrorism.

The Committee for the Scientific Investigation of Claims of the Paranormal had its tenth-anniversary celebration in Boulder, Colorado, on 27–29 April 1986. Its journal, *The Skeptical Inquirer*, now has a circulation of 27 000. And beginning with the Austin Society to Oppose Pseudoscience (of which I am president) in October 1981, 20 grass-roots groups loosely associated with CSICOP, each with its own newsletter, have been organized in the US, and about eight groups overseas.

One of the obvious implications of Oppenheim's article is that it was the involvement of men with solid achievements in science in parascience activities that gave the latter their luster. By the same token it is the special responsibility of men with front-rank scientific standing to expose and oppose pseudoscience. On that account we are particularly pleased to count in our ranks Murray Gell-Mann, John A. Wheeler and Eduardo Amaldi, among many others.

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Janet Oppenheim's interesting article "Physics and psychic research in Victorian and Edwardian England" refers to earlier attempts to "reconcile science and faith" in the hope that "religion could be made more compatible with the teachings of modern science." I have always been puzzled by this controversy. Is there really any incompatibility? The imagined incompatibility seems to involve a presumed difference between scientific and religious methodologies, and an application of Occam's razor leading to the hope that all phenomena should be explicable in purely material terms. For the following reasons, I suggest that the difference has been exaggerated and that the hope is unrealistic.

A significant part of scientific method (namely, the testing of hypotheses by experiment) dates at least from the Old Testament,[1] where Elijah proposed a public experiment as a means of choosing between contemporary alternative hypotheses (Baal and Jehovah). This shows that the idea of applying to religious topics what we now presume to call "scientific" method predated by a considerable time the application to material topics. Moreover, as Max Born[2] among others has pointed out, scientific method, in the context of experiments made in the natural sciences at least, is based on faith in the "constancy of Nature." This is a fruitful hypothesis on which we normally act without thinking, although its validity has not been proven. According to Webster's dictionary, one meaning of the term faith is a "firm belief in something for which there is no proof."

Attempts to describe known phenomena in purely material terms have had many successes and some failures.[3] One notable failure is surely the attempt to account for the origin of life on Earth. "Natural selection" from pre-existing species clearly cannot account for the origin of anything (perhaps *The Origin of Species* should have been more accurately entitled *The Modification of Species*). The purely material explanation would seem to boil down to the proposal that chance encounters between initially inanimate parts of matter, assisted perhaps by radiation from outer space, continued for a sufficient number of billions of years, led to the origin of life in general and the human brain in particular. Clearly, if such an explanation is tenable, we need wait only a fairly short time until somewhere a factory full of inanimate matter (electronic components, even) accomplishes by chance the comparatively trivial task of assembling itself into a Cray computer—in working order.

References

1. 1 Kings 18:20–40.
2. M. Born, *Natural Philosophy of Cause and Chance*, Dover, New York (1964).
3. W. R. Fix, *The Bone Peddlers—Selling Evolution*, Macmillan, New York (1984).

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Beaming with pride

We were pleased to see a photograph of our experiment appear on the cover of PHYSICS TODAY (April 1986, upper right-hand corner), but dismayed that its source was not acknowledged. For the sake of those astute readers who detected something amiss in the caption (page 35), let us explain what is going on in the picture.

The picture shows not the doubling of a dye laser beam, but the mixing of the orange dye beam with the blue beam from an argon ion laser, producing an ultraviolet beam at the sum of the two input frequencies. Such sum-frequency-mixing experiments have different phase-matching conditions and are capable of generating shorter wavelengths than are possible with just doubling. Also, by taking advantage of a more powerful ion laser beam, as was done in the experiment shown, they can generate more tunable output power than doubling.

There are two things unusual about our experiment. First, each input beam is a circulating beam within the cavity of its respective laser. The only common path the two beams share is that in the nonlinear mixing crystal (which one may find in the center of the picture by following the two converging beams—it is a potassium dihydrogen phosphate crystal housed in the suspended black box). The beam intensities inside these laser cavities are each about ten times greater than what one could generate as output beams, greatly enhancing the nonlinear mixing process. Intracavity enhancement of both mixing beams is not often done because of the complexity of the optics that it usually requires. But the separation of the two cavities was easy here because the experiment was done in the large-beam-diameter collimated arm of the ring dye laser cavity. Thus the ordinary dispersion of the Brewster-angled, prism end of the KDP crystal was sufficient to separate the beams by several spot diameters.

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Putting fun into physics

Peter Grant is sadly mistaken in his allegation in his letter (August, page 13) that no one has seriously attempted to find solutions to the problem of why students dislike physics.

For the past two summers, the American Association of Physics Teachers has addressed that problem and others in its Physics Teaching Resource Agent program. This program was developed by Donald F. Kirwan of the University of Rhode Island and Jack M. Wilson, executive director of the AAPT. Its aim is to train experienced, enthusiastic high school physics teachers to help other teachers in their local areas.

At an intensive three-week program, the resource agents learn how to use computers, applications of educational research, and methods of building stu-